

# New York Feral Swine Management Report

April 1, 2016 – March 31, 2017



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## EXECUTIVE SUMMARY

Feral swine (*Sus scrofa*) are a growing problem all across the country and a serious concern for New York. Feral swine have a high reproductive capacity and populations can quickly expand to colonize new areas (Wood and Barrett 1979, Waithman et al. 1999). Historically in New York, there were four known breeding populations of feral swine, located in Onondaga, Cortland, Tioga, Sullivan, Delaware, and Clinton Counties. The breeding populations are thought to be a result of escaped swine from shooting preserves and breeding facilities. New York Wildlife Services (WS) has developed a five-prong elimination plan which includes on the ground management and surveillance, an early detection network, collaborating with NYSDEC law enforcement, aerial surveillance, and canine surveillance. WS is utilizing these strategies to document the elimination of Eurasian boar populations from New York State.

Wildlife Services personnel in New York have acquired access to 164 properties, comprising over 77,654 acres, in Cortland, Onondaga, Tioga, Delaware, Sullivan, St. Lawrence, Clinton, and Essex Counties to conduct feral swine elimination. In an effort to locate any remaining feral swine in New York, WS placed 117 trail cameras on the landscape, logging 14,191 camera nights and recording 97,984 photos in which only one feral swine was detected. WS also investigated 36 feral swine reports that were directed to WS by the public or through NYSDEC electronic feral swine reporting system. These reports were investigated by WS personnel and consisted of; domestic pig sightings and damage, pig carcasses, damage by other wildlife, and mistaken identification of other wildlife. Wildlife Services conducted aerial surveys via fixed-wing aircraft in February 2017. WS flew 540.8 square miles with 23.9 flight hours. Detection dogs were also used to determine if feral swine were still present on the landscape where breeding populations had previously existed. WS performed 71 canine surveys in six counties, totaling 174 hours. WS detected a single Eurasian boar in August 2016 in St. Lawrence County after investigating a feral swine report from the public. Wildlife Services increased its monitoring efforts in this area to locate and remove the Eurasian boar. It was sighted again in March 2017 and removed by a local resident. WS verified that it was the previously sighted and monitored boar.

Populations at very low levels of abundance are exceedingly difficult to detect, knowing with any certainty when elimination has been achieved is extremely difficult (Morrison et al. 2007). However, our intensive monitoring program has not detected a breeding population in New York since October, 2014. A variety of monitoring techniques (e.g. aerial surveys, canine surveys, trail cameras) implemented in concert can enhance our ability to detect feral swine, but absolute certainty of feral swine absence can only be attained by the passage of time without detection (Morrison et al. 2007).

There are a few key issues that should be addressed to ensure that New York remains swine-free for the long-term. Some high-fence hunting operations have taken advantage of an obvious loophole in the new Eurasian boar regulations and are now offering domestic “meat pig” hunts. Even though these are domestic pigs, they do represent a potential source of feral swine. The concern is that domestic pigs maintained in a semi-natural environment, such as within an expansive high-fence enclosure of tens or hundreds of acres will, over time, develop wild behavioral traits that would greatly increase their ability to survive and establish populations in the wild if they were to escape or be released from confinement. If these animals escape from high-fenced shooting or breeding facilities, they can cause a tremendous amount of damage to the landscape. This issue will have to be addressed in the future.

The possibility that feral swine populations could expand into New York from bordering states or Canada remains. The next step is to build long term monitoring plans to make certain new populations are not introduced into the state. This plan should include, at least, a border surveillance component along the New York/Pennsylvania, Ohio, and Quebec borders where populations of feral swine exist. It is also imperative to have an enhanced early detection network established in these areas and to continue investigating feral swine reports from the public.

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## **Impacts of Feral Swine**

Feral swine (*Sus scrofa*) are a growing problem across the country and a serious concern for New York. They are a direct threat to agricultural production, natural resources, and human health and safety. Rubbing, rooting, and wallowing by feral swine causes damage to agricultural field crops, turf, landscaping, orchards, and vineyards. These habits adversely affect soil and water quality through soil erosion and sedimentation, wetland degradation, and the introduction of nutrients and pathogens into surface waters. Feral swine impact native wildlife and plant communities through direct predation, consumption, resource competition, habitat destruction, and disease transmission (Seward et al. 2004). Sensitive ecosystems, critical habitats, and threatened and endangered species are particularly vulnerable to these impacts. Feral swine can harbor and transmit up to 30 diseases and 37 parasites that can affect people, pets, livestock, and wildlife (Hutton et al. 2006). Disease risks from feral swine could have the greatest potential impact on commercial pork productions, a \$38 million industry in New York (Witmer et al. 2003). Finally, though it is rare, feral swine have been known to behave aggressively toward humans, especially where habituation to human resources (eg. wildlife feeders, waste disposal) put people and feral swine in close proximity (Draft EIS, USDA).

When compared to states such as Georgia, Alabama, Texas, and California, feral swine populations in New York were relatively small and isolated. Georgia estimated that in 2011 feral swine caused \$81 million in agricultural and property damage (Mengak 2012). A 2009 survey estimates that feral swine caused \$75 million in damage to agricultural crops in Alabama (Shi et al. 2010). Since 2008, when the first known breeding populations were discovered, Wildlife Services in New York estimates that feral swine have accounted for over \$2,578,453.66 in damage and management efforts. If feral swine are not eliminated from New York, the state's residents can expect a significant amount of damage caused by feral swine and the cost associated with it.

As feral swine hunting has grown in popularity across the United States, so have feral swine populations. Feral swine populate the landscape by escaping from enclosed shooting facilities and are released intentionally into the wild to increase hunting opportunities (Bratton, 1975). The intentional release of swine by hunters and the accidental release of European wild boar from enclosed shooting facilities are the major factors in the increase of feral swine populations across the United States (Missouri Dept. of Conservation 2012). This report provides an update on Wildlife Services' field activities from April 1, 2016 to March 31, 2017.

## **Status in New York**

To date there have been four distinct breeding feral swine populations documented in New York located in Tioga, Cortland/Onondaga, Delaware/Sullivan, and Clinton Counties. Three of these populations are believed to have originated from animals escaping high-fence wild boar hunting preserves. Wildlife Services has reason to believe that the population in Clinton County originated from swine intentionally released on the landscape for hunting purposes. The establishment of free roaming feral swine populations by animals that have escaped or were intentionally released from such facilities has been documented throughout the country (Kaller and Reed, 2010; Missouri Dept. of Conservation, 2012). Through aggressive removal efforts by USDA APHIS, Wildlife Services (WS) and New York State Department of Environmental Conservation (NYS DEC), all known feral swine have been removed in the past four years and the four breeding populations eliminated. Wildlife Services has found no credible evidence of any wild Eurasian boar in Cortland/Onondaga County since 2012, Tioga or Clinton Counties since 2013, and Delaware/Sullivan Counties since 2014. However, in September 2016 WS did detect one feral swine located in St. Lawrence County, New York. After investigating a feral swine report and placing monitoring cameras on the landscape, WS obtained photos of a single castrated Eurasian boar. On March 17, 2017, a local resident removed the boar. This was confirmed to be the feral swine WS has been

pursuing in St. Lawrence County since August of 2016. The feral swine was a 400 pound castrated boar with an import tag in his ear. Feral swine are given these tags when they are imported to the US from Canada. WS worked with its National Wildlife Research Center and government officials from Canada to obtain records from this tag number. The pig was from a load of 169 wild boar that was shipped to Rensselaer Falls, New York on April 12, 2004. WS investigated a known game farm owner in Lisbon, New York where this swine was believed to come from. WS investigated the sight of the removal as well as the surrounding land it was believed to have been feeding in. Scat and tracks were found, and a remote monitoring camera was placed where the swine was traveling. WS sent hair samples to the National Wildlife Research Center in Fort Collins, Colorado to be tested and added to the National Feral Swine DNA database. WS has not detected or investigated reports of any feral swine sightings since the removal.

Wildlife Services was able to implement its feral swine management plan and protect the state's resources through grants provided from the Environmental Protection Agency's Great Lakes Restoration Initiative and New York State Department of Environmental Conservation Invasive Species Council. New York Wildlife Services also receives support from USDA National Feral Swine Management Program.

### **Cooperating Agencies**

Strong interagency partnerships have been essential for effective feral swine management in New York. Wildlife Services works closely with New York State Department of Environmental Conservation, New York State Department of Agriculture and Markets, and USDA Veterinary Services. These agencies developed and enforced feral swine regulations, performed inspections of game preserves and high-fenced shooting facilities, and assisted with reporting feral swine sightings to WS. County governments provided WS with cadastral data that was essential for securing access to private property to conduct management efforts. WS also worked with New York State Office of Parks, Recreation and Historic Preservation; USDA Farm Service Agency; Cornell Cooperative Extension; and non-governmental organizations including The Nature Conservancy, Audubon Society, Humane Society, Broome County Soil and Water Conservation District, Partnership for Regional Invasive Species Management (PRISM), Finger Lakes Land Trust, New York State Conservation Council, New York State Fish and Wildlife Management Board, and New York Forest Owners Association.

### **Monitoring Activities**

New York WS has developed a five-prong approach elimination plan which includes; on the ground management and surveillance, an early detection network, collaborating with NYSDEC law enforcement, aerial surveillance, and canine surveillance. WS is utilizing these strategies to document the elimination of Eurasian boar populations from New York State.

*On the Ground Management and Surveillance.* - As of March 31, 2017, WS has acquired written permission from 164 private landowners and public land managers to access 77,654 acres of property to conduct feral swine management activities (Table 1). All of these properties are in areas where feral swine have been reported, where feral swine populations had previously been documented, and in close proximity to high-fence game farms that were known to have Eurasian boars. WS employees conducted periodic surveys on these properties, both by foot and by ATV, to determine if feral swine were present. During these surveys, technicians searched for evidence of feral swine such as, scat, tracks, tree rubs, rooting, and wallows. Technicians also maintained numerous trail cameras in areas where feral swine had previously been present or where a credible feral swine report was located. Trail cameras were deployed continuously, except for during deer and turkey hunting seasons. Cameras were checked every 2-6 weeks to see if feral swine photos had been captured. In total, WS reviewed 97,984 photos from 117 trail camera locations (Table 2).

Table 1. The number of cooperators in each county and the acreage that was monitored by Wildlife Services for feral swine activity from April 1, 2016 to March 31, 2017.

<b>County</b>	<b>Number of Properties</b>	<b>Area (Acres)</b>	<b>Feral Swine Detected</b>
Clinton	56	25,238	No
Essex	20	5,803	No
Onondaga	16	6,522	No
Cortland	14	8,652	No
Tioga	14	8,991	No
Sullivan	8	452	No
Delaware	23	14,977	No
St. Lawrence	13	7,019	Yes
<b>Total</b>	<b>164</b>	<b>77,654</b>	<b>Yes</b>

Table 2. Trail cameras deployed to monitor feral swine in New York from April 1, 2016 to March 31, 2017.

<b>Population</b>	<b>Camera Locations</b>	<b>Camera Nights</b>	<b>Photos Reviewed</b>	<b>Swine Detected</b>
Cortland/Onondaga	27	3,990	42,022	No
Tioga	11	1,938	8,427	No
Clinton	15	2,224	5,542	No
Essex	6	1,014	2,458	No
Delaware	11	1,821	5,480	No
Sullivan	11	1,915	13,296	No
St. Lawrence	12	1,017	6,501	<b>Yes</b>
Other	14	272	14,258	No
<b>Total</b>	<b>117</b>	<b>14,191</b>	<b>97,984</b>	<b>Yes</b>

*Early Detection Network.* - Wildlife Services worked with cooperating agencies and news outlets to inform the public, build public awareness of the program, and encourage people to report feral swine sightings to WS or NYSDEC. From April 1, 2016 to March 31, 2016, WS spoke to three groups about feral swine management and disease surveillance in New York, with a total of approximately 350 participants.

In April 2016, WS presented information and updates on New York’s feral swine elimination program to over 100 natural resource professionals at the International Wild Pig Conference in Myrtle Beach, South Carolina. At this event, Wildlife Services personnel presented on “Building Community Support for feral swine management: case studies and lessons learned from New York.” WS also presented a poster titled “Using Detection Dogs to Verify Elimination of Eurasian Swine in New York.”

In September 2016, WS was invited by the Quebec Ministry of Forests, Wildlife, and Parks to conduct a feral swine workshop in Victoriaville, Quebec. There is an emerging feral swine population at this location and Canada is hoping to eliminate it. WS presented four in-the-classroom informational presentations about feral swine biology and identifying feral swine sign; what New York did and our path to elimination; different feral swine elimination strategies; and how to determine elimination. An afternoon session

included a demonstration where New York WS personnel erected a corral trap and provided tips on what works versus what doesn't work for capturing feral swine. After that, the group headed into the field where there was actual feral swine and WS helped identify sign and elimination strategies.

In March 2017, WS held a multistate meeting in Lake George, New York to exchange information about various topics, one being feral swine. Employees for both New York and New Hampshire USDA Wildlife Services presented workshops on the status of feral swine in the respective states to 100 wildlife professionals. WS also held an information booth at Empire Farm Days in Seneca Falls where information was presented to landowners, farmers, and business owners about feral swine damage and impacts.

Wildlife Services and NYSDEC worked together to look into reports made by the public of possible feral swine activity in the state. These reports are usually submitted to NYSDEC, and then forwarded on to WS for further investigation if necessary. This process is the foundation of Wildlife Services' early detection network. WS investigated 36 such reports from April 1, 2016 to March 31, 2017. The nature of the reports included observation of a feral swine (18), feral swine carcass (3), camera photos (8), feral swine noises (3), swine road kill (1), feral swine scat (2), and feral swine removal (1). Wildlife Services performed site visits for 19 of these reports (Figure 1). Fifteen investigations were conducted through phone or email conversations. During site visits, WS personnel spoke to the individual who made the report as well as residents and business owners in the area. Whenever possible, WS spoke with owners of domestic pigs to see if any of their animals had escaped around the time of the report. WS personnel also scouted the area for evidence of feral swine activity when access to property was available. Twelve of these reports turned out to be the result of escaped domestic pigs. Fifteen of the reports were likely cases of mistaken identity in which other wildlife such as turkeys, raccoons, bears, coyote silhouettes, etc. were mistaken for feral swine. A report of a wild Eurasian boar from St. Lawrence County was confirmed by WS.

Wildlife Services identified one feral swine in the Lake Ontario watershed. The wild Eurasian boar was discovered in St. Lawrence County, and is believed to have escaped from a high fenced shooting preserve several years ago. WS was notified in the summer of 2016 by a landowner who got trail camera pictures of the boar in previous years, but did not notify WS until recently. WS set up monitoring cameras in the area and obtained pictures of the feral swine which was identified as a single, castrated, mature boar in August 2016.

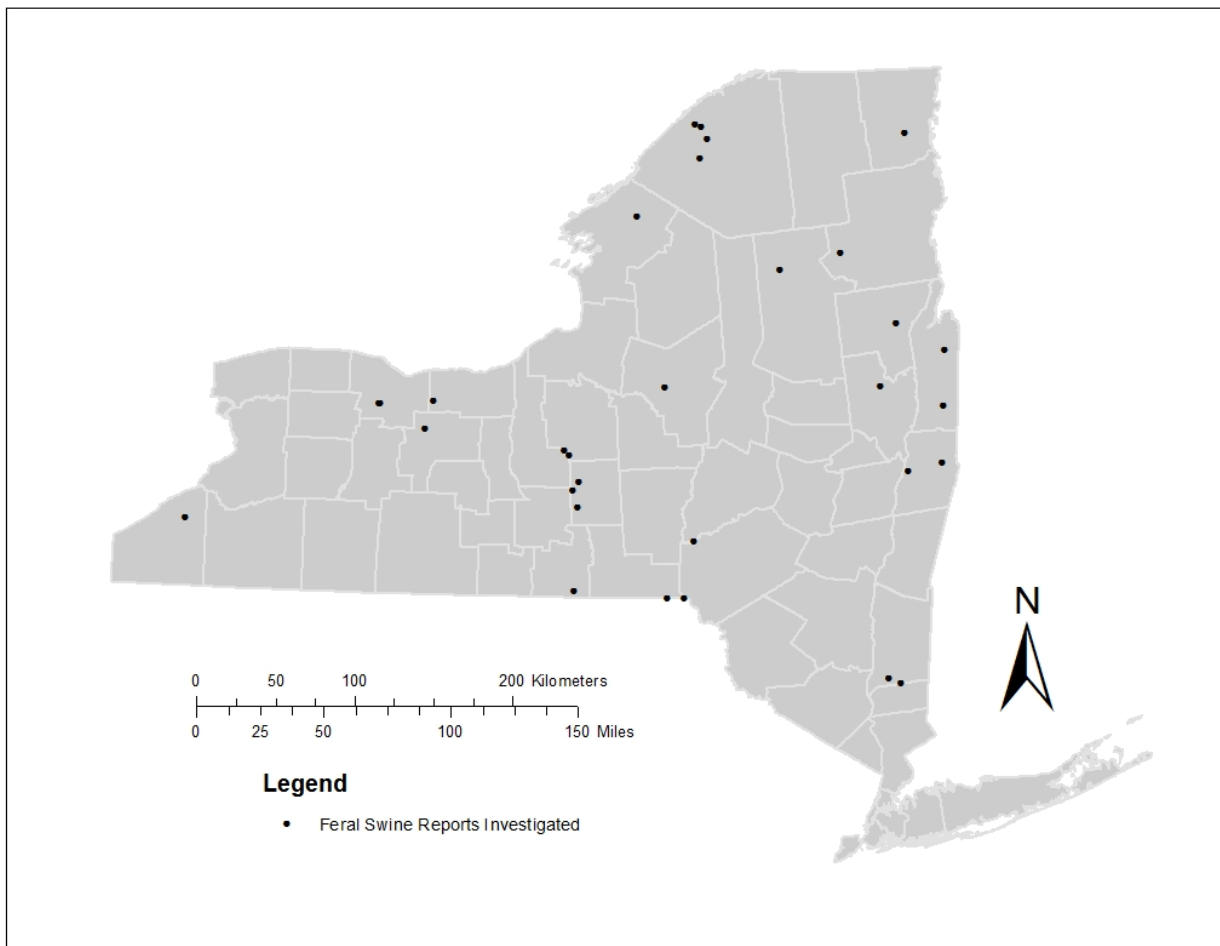


Figure 1. Distribution of feral swine reports investigated by USDA-APHIS, Wildlife Services from April 1, 2016 to March 31, 2017.

*Collaborating with Law Enforcement.* - Wildlife Services continued to work closely with NYSDEC law enforcement during the last year by providing support to officers working to enforce new Eurasian boar regulations. WS personnel provided man power and expertise on the identification of Eurasian boar physical characteristics while participating in inspections and compliance checks of high-fence shooting facilities, game farms, animal preserves, and other facilities that had or may have possessed Eurasian boars. WS also worked with NYSDEC law enforcement to help identify an unknown registered breed of domestic pigs that possessed Eurasian characteristics. NYSDEC aided in obtaining information in regards to the removal of the boar in St. Lawrence County. They were able to obtain the ear tag from the boar and provide contact information for additional assistance about the removal.

*Aerial Surveillance.* - Wildlife Services conducted its aerial surveillance program for feral swine February 1-6, 2017. The primary objectives for the survey are to detect the presence of feral swine or feral swine damage and estimate the number of free roaming feral swine in the survey area. The survey was to be conducted using a fixed-wing Cessna 172 aircraft crewed by one USDA, WS pilot and one USDA, WS wildlife biologist. Wildlife Services conducted aerial surveys via fixed-wing aircraft in February 2017. WS flew 540.8 square miles with 23.9 flight hours. The flight crew searched the landscape using a gridline pattern to maximize coverage. A ground crew of at least one WS personnel was in place at all times to provide support to the flight crew and inspect possible feral swine sign observed from the air. As a result from the surveys, WS personnel investigated two sites in both Tioga County and in St. Lawrence County for possible feral swine damage. All sites investigated were determined to be turkey (*Meleagris gallopavo*)



or white-tailed deer (*Odocoileus virginianus*) damage, tracks, and/or activity.

*Canine Surveillance.* - Wildlife Services continued the canine surveillance component of their monitoring program in August of 2016. Working Dogs for Conservation (WD4C) was contracted again by USDA Wildlife Services in New York to help confirm elimination of Eurasian swine from the landscape. Based out of Montana, WD4C trained 5 conservation dogs to detect feral swine scat.

The dogs were first trained in a controlled environment where the pig scat was either present or absent. The dogs are trained to sit when pig scat is detected, and once confirmed they were rewarded. The training then progressed to natural settings where a sample of pig scat was placed in the environment for the dogs to detect. The primary goal is to expose and maximize detection opportunities for the dogs where feral swine are naturally occurring in the environment. A secondary goal is to determine at what distance the dogs first detect feral swine scat, also known as detection distance.

Refresher training for the detection dogs occurred in Texas, Montana, and New York in 2016. In January 2016, WD4C traveled to Caddo Lake Wildlife Management Area in Karnack, Texas where there is an active feral swine population. The dogs had the opportunity to detect naturally occurring feral swine scat in the environment as opposed to placed scats by handlers. Between July 22 and August 3, 2016, the dogs ran a set of detection trials in Montana using Eurasian swine scat collected by WS personnel.

Two additional training sessions occurred in New York on August 12-13. WD4C and WS personnel did a site visit at a local high fenced shooting facility located in Moravia, New York. This facility offers “meat hog” hunts to the public and was willing to allow WD4C to use their pig holding pens for detection dog training. Several pig scats were collected and placed in a field adjacent to the facility for the dogs to detect. On August 13, 2016 WS placed several swine scats in Hewitt State Forest, New York for detection trials. The detection dogs were successful at detecting both domestic scat as well as feral swine scat that had been collected from other states.

Between August 15, 2016 and September 6, 2016, detection dog surveys were conducted in seven counties in New York (Cortland, Onondaga, Tioga, Delaware, Sullivan, Essex, and Clinton) and also Bradford County, Pennsylvania, where feral swine populations had previously been known to exist. Transects were created using ArcMap software and uploaded onto handheld Trimble GPS units for navigation in the field (ex. Figure 2). All 5 dogs were used in all of the counties, each having its own WD4C handler and a New York WS person to identify any scat detections.

Seventy-one transect surveys were conducted in 17 calendar days, with each day deploying three teams. The average transect survey was 6.7 km and required 2 hours 35 minutes to complete (Table 3). The survey teams traveled a total of 437.6 km in 173 hours 33 minutes, whereas the detection dogs traveled a total of 611 km.

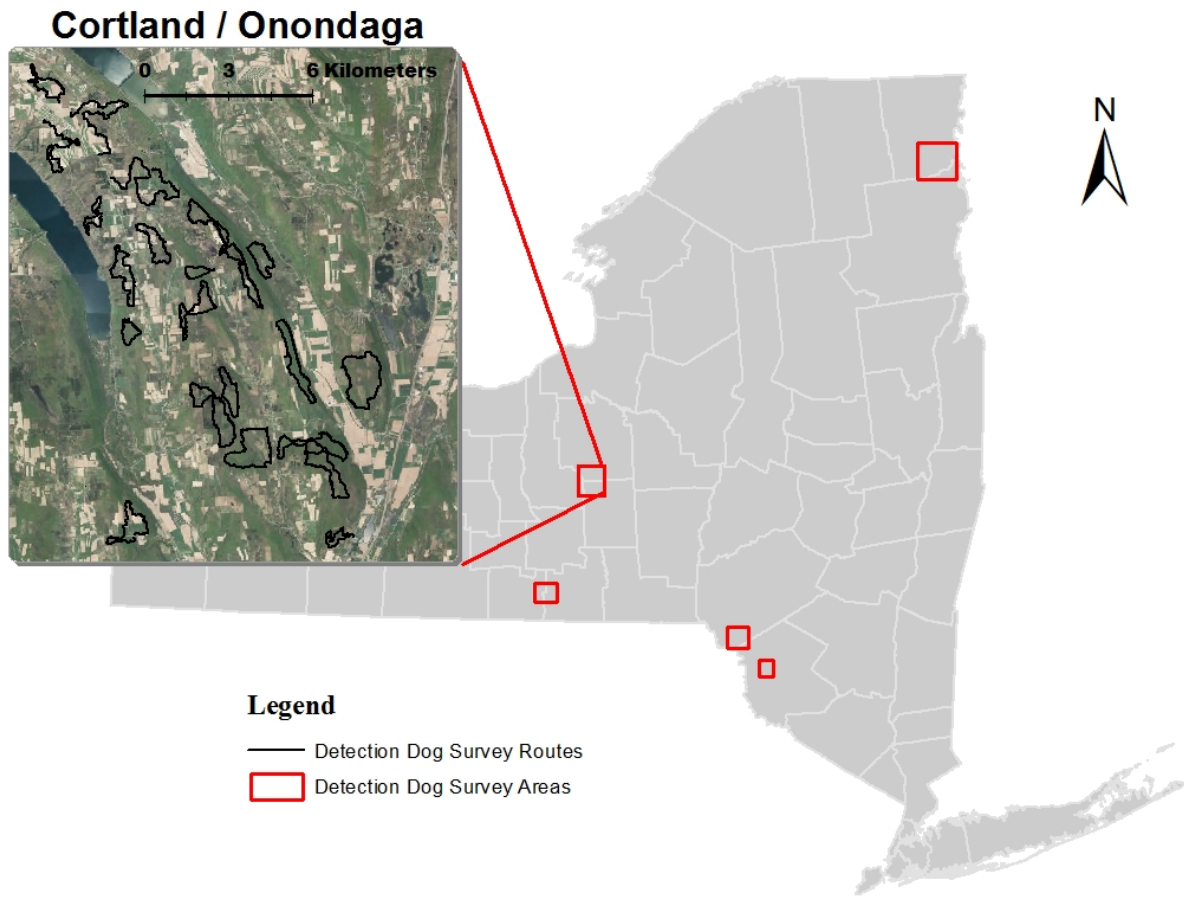


Figure 2. Detection dog survey routes located in Onondaga and Cortland Counties, NY that were completed by USDA-APHIS Wildlife Services and WD4C.

Table 3. Number of transects completed, distance, and time covered by detection dog survey teams in New York, August 15, 2016 to September 6, 2016.

County	Number of surveys	Survey length (handler km)	Average survey length (km)	Survey length (dog km)	Survey duration (hours)	Average survey duration (hours)
Cortland/Onondaga	27	146.54	5.43	202	56.11	2.07
Clinton	19	119.18	6.27	185	47.95	2.52
Delaware	13	81.39	6.26	110	35.2	2.70
Tioga	11	82.52	7.50	106	31.48	2.86
Sullivan	1	7.94	7.94	8	2.81	2.81
Total	71	437.57	6.68	611	173.55	2.59

The dogs alerted to one detected scat in Delaware County. WS determined the scat was from a black bear, a species which that particular dog had been trained to detect. The largest detection distance recorded for feral swine scat and domestic pig scat was 10 and 15 meters, respectively. Detection distance varied depending on wind direction, humidity, air temperature, and age of the scat.

## Surveillance Summary

While conducting these elimination strategies, Wildlife Services employees spent 447 hours scouting for feral swine, including physically looking for feral swine sign, as well as performing canine surveillance and investigating feral swine reports. Wildlife Services spent over 103 hours conducting outreach to cooperators, landowners, and the general public about feral swine elimination. Wildlife Services spent 501 hours driving over 28,000 miles to conduct scouting efforts and investigate feral swine reports throughout the state of New York (Figure 3).

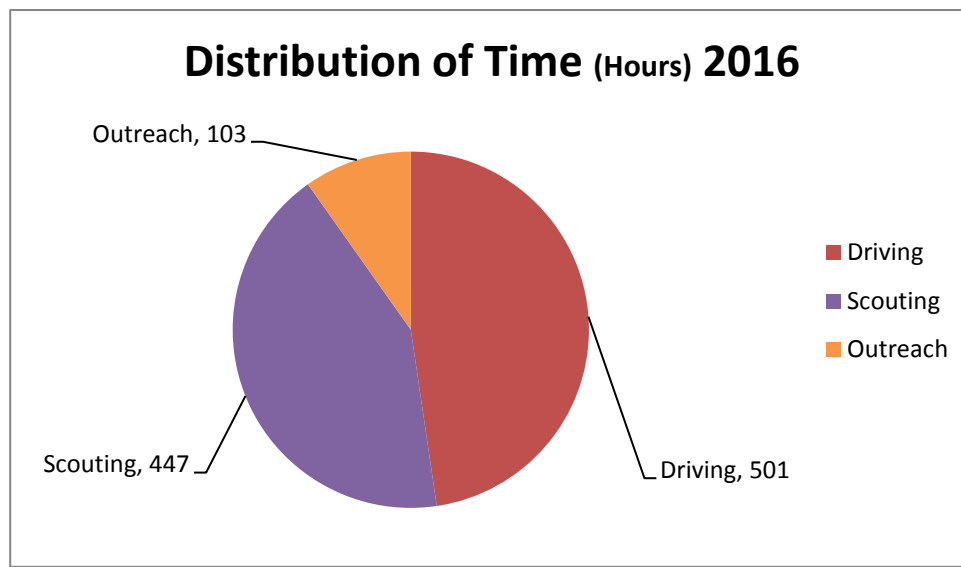


Figure 3. Distribution of time spent in the field by Wildlife Services personnel during feral swine management in New York, April 1, 2016 to March 31, 2017.

## Future Implications

Populations at very low levels of abundance are exceedingly difficult to detect. Knowing with any certainty when elimination has been achieved is extremely difficult (Morrison et al. 2007). Terminating an eradication program before we are reasonably certain that complete elimination has been achieved could result in failure, wasted time, and wasted funds. Feral swine have been known to reinvade up to two years after a population was presumed eliminated (Schuyler et al. 2002). The single castrated boar went undetected in St. Lawrence County since 2016 despite all active measures taken to ensure elimination. A variety of monitoring techniques (e.g. aerial surveys, canine surveys, trail cameras) implemented in concert can enhance our ability to detect feral swine, but absolute certainty of feral swine absence can only be attained by the passage of time without detection (Morrison et al. 2007). However, there are a few key issues that should be addressed to ensure New York remains absent of feral swine for the long-term.

The prohibition of Eurasian wild boars in New York was a critical step in our effort to permanently eliminate this invasive species. However, some high-fence hunting operations have taken advantage of an obvious loophole in the law and are now offering domestic “meat pig” hunts. Even though these are domestic pigs, they do represent a potential source of feral swine. The concern is that domestic pigs maintained in a semi-natural environment, such as within an expansive high-fence enclosure of tens or hundreds of acres will, over time, develop wild behavioral traits that would greatly increase their ability to survive and establish populations in the wild if they were to escape or be released from confinement. Domestic pigs raised for the purpose of meat production using conventional husbandry practices are not

likely to fare well in the wild after escaping. This inability to thrive in the wild is due in part to the lack of certain developmental stimuli necessary for the animals to develop behavioral characteristics needed in the wild (Stolba and Wood-Gush, 1989). It is well documented that most of the wild pigs in the US originated from domestic stock, but in almost all cases it was from domestic stock that were loosely maintained under free range practices in which the animals had no reliance on humans. Another reason is that pen-reared pigs, domestic or Eurasian, form strong associations with humans that may preclude their ability to transition to a free-living lifestyle (Graves, 1984; Lewis, 1966). However, research has shown that domestic pigs moved to a spacious, semi-natural enclosure with multiple habitat types and minimal human interaction will develop a repertoire of behaviors resembling that of the Eurasian wild boar within 1–6 months (Stolba and Wood-Gush, 1989). This is the basis for the often misunderstood concept that pigs readily “go wild” or become wild boars after escaping confinement.

In this way, shooting preserves that keep domestic pigs in such a manner could act as a bridge between domestic and feral states of existence (Diong, 1982), especially if recruitment occurs by way of reproduction within that environment rather than by re-stocking with pen-reared animals. Indeed, there are high-fence hunting operations in the state that maintain their stock in spacious, semi-natural environments. Additionally, it benefits the operation to maintain animals that have wild behavioral characteristics because they offer a more authentic and marketable “hunting” experience. If these animals ever escape from high-fenced shooting or breeding facilities, they can cause a tremendous amount of damage to the landscape. This issue will have to be addressed in the future.

There is still the possibility that feral swine populations could expand into New York from bordering states or Canada. New York has been proactive in its adoption of regulations that minimize the risk of feral swine invasions from within. However, lax regulations regarding Eurasian boars in neighboring states, most notably Pennsylvania, pose an ongoing threat. Wildlife Services has spent nearly six years managing feral swine in Tioga County, a population that was established by animals that escaped a shooting preserve in bordering Bradford County, PA (USDA, 2010). Though our ability to influence policy in other states is limited, targeted public outreach in communities along the Pennsylvania border may be warranted to facilitate early detection of feral swine in those areas. This type of outreach could be accomplished with minimal investment by partnering with organizations that regularly interact with landowners in these high-risk areas. Agencies such as USDA-Farm Service Agency (FSA), USDA-Natural Resource Conservation Services (NRCS), Cornell Cooperative Extension, as well as various private landowner groups and associations already have methods in place to disseminate information to the people most likely to encounter feral swine invading from outside the state. More direct long-term surveillance methods, such as trail cameras and active scouting by trained wildlife technicians, is needed where feral swine populations are known to exist within close proximity to the New York State border. Being able to monitor or regulate these sites is imperative for maintaining the elimination status of feral swine in New York.

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